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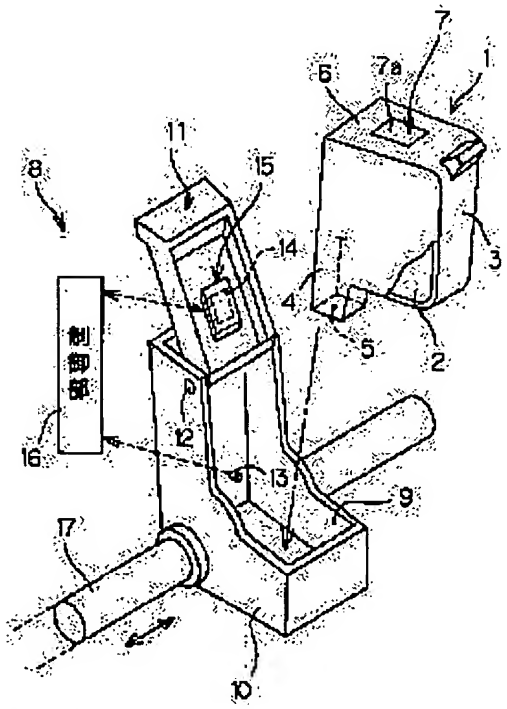
(54) INK CARTRIDGE WITH RESPONDER AND PRINTER EMPLOYING IT



(57)Abstract:

PROBLEM TO BE SOLVED: To obtain an ink cartridge in which the type thereof can be determined easily and inexpensively.

SOLUTION: A responder 7 is fixed onto the upper surface of a cartridge body 3. The responder 7 constitutes a closed circuit having a coil and a capacitor. The cover 11 of a holder 10 for fixing a cartridge 1 is provided with a scanner 15 having an antenna 14. The scanner 15 oscillates an electromagnetic wave having a resonance frequency of the responder 7 in a cartridge 1 of regular type. Upon receiving the electromagnetic wave, the responder 7 oscillates an echo wave and a control section 16 determines the type of the cartridge 1 based on the echo wave. When the type of the cartridge is unsuitable, operation of a printer 8 is inhibited.

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NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

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CLAIMS

[Claim(s)]

[Claim 1] It is the ink cartridge with a transponder characterized by it being attached in the cartridge body which has the ink room in which ink is stored, and this cartridge body, and having a transponder with the predetermined resonance frequency corresponding to the model of cartridge, for this transponder being constituted by the closed circuit containing a coil and a capacitor, resonating on the electromagnetic wave which has the frequency which is in agreement with the above-mentioned predetermined resonance frequency, and oscillating an echo wave.

[Claim 2] The above-mentioned transponder is an ink cartridge with a transponder characterized by carrying out mold omission of the aluminium foil of at least 1 to a curled form, and forming the coil while forming a capacitor between the aluminium foil of the couple pasted up on both sides of an insulating film, respectively.

[Claim 3] A printer equipped with a signal output means to be the printer which has a holder holding an ink cartridge according to claim 1 or 2, and to output a signal to a control section by receiving the echo wave from a transponder while oscillating the electromagnetic wave which is in agreement with the resonance frequency of the control section which controls operation of a printer, and the transponder attached in the ink cartridge.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the printer using the ink cartridge with a transponder and this which oscillate an echo wave according to the electromagnetic wave of a predetermined frequency.

[0002]
[Description of the Prior Art] In recent years, what sets the ink cartridge which the ink jet printer had spread quickly and held ink to the holder by which both-way actuation is carried out, and uses it for right and left of a printer is common. As ink stored in the ink room of a cartridge, there is ink used for the particular application of other, for example, MICR, ink [ink / for general OA / ink jet], fluorescence ink, edible ink, etc. On the other hand, although a water or oily thing is used as ink, since the physical-properties values (surface tension, a consistency, viscosity, etc.) of an ink ingredient have big effect on generating of an ink droplet and influence the blinding of a nozzle, various ingredient selections are performed. That is, what suited the injection method of the print head and the method which controls the print head is chosen.
[0003] Thus, although various ink exists as an object for ink jet printers, it is desirable to be communalized as much as possible as a cartridge which holds this, when aiming at the cost cut by volume efficiency. However, when filling up with ink which is different in a common cartridge, the cartridge which the user mistook for the cartridge for general OA, and was filled up with the ink for special is used, and there is a possibility of causing nonconformity to a printer and a cartridge.
[0004] While this invention is made in view of the above-mentioned technical problem and being able to attain a cost cut through communalization of components, it aims at offering the ink cartridge with a transponder which does not have a possibility of causing nonconformity in a print facility, and the printer using this.
[0005]
[Means for Solving the Problem] As a technical-problem solution means for attaining the above-mentioned object, the mode of invention according to claim 1 It is attached in the cartridge body which has the ink room in which ink is stored, and this cartridge body. It has a transponder with the predetermined resonance frequency corresponding to the model of cartridge. The ink cartridge with a transponder characterized by for this transponder being constituted by the closed circuit containing a coil and a capacitor, resonating on the electromagnetic wave which has the frequency which is in agreement with the above-mentioned predetermined resonance frequency, and oscillating an echo wave is offered.
[0006] In this mode, an electromagnetic wave is oscillated towards a transponder from the scanner formed in a printer side. If the electromagnetic wave which is in agreement with the resonance frequency which self has is received, a transponder will resonate on a carrier beam electromagnetic wave, and will oscillate an echo wave. A scanner can receive this echo wave and existence of the transponder (equivalent to a resonance tag) of a predetermined frequency can be recognized. Thereby, the model of cartridge can be recognized by non-contact. Since it is the easy structure containing a coil and a capacitor, actuation is trustworthy while a manufacturing cost is cheap.
[0007] The mode of invention according to claim 2 is characterized by carrying out mold omission of the aluminium foil of at least 1 to a curled form, and the above-mentioned transponder forming the coil while it forms a capacitor between the aluminium foil of the couple pasted up on both sides of an insulating film, respectively in claim 1. the very thin structure which pasted up aluminium foil on both sides of an insulating film in this mode -- cost -- since a cheap transponder is realizable, an ink cartridge is not enlarged
[0008] The mode of invention according to claim 3 is a printer which has a holder holding an ink cartridge according to claim 1 or 2, and it offers a printer equipped with a signal output means to output a signal to a control section, by receiving the echo wave from a transponder while it oscillates the electromagnetic wave which is in agreement with the resonance frequency of the control section which controls operation of a printer, and the transponder attached in the ink

cartridge.
[0009] In this mode, since it can distinguish by the printer side whether it is the ink cartridge which suits a printer, it can prevent certainly that it is used by special ink, for example to the printer for standard ink, mistaking. Thereby, it can collateralize attaining communalization of the components of most cartridges substantially. In addition, a signal output means may oscillate only the frequency of a proper to the transponder contained in the cartridge which suits a printer, and may oscillate the electromagnetic wave of the frequency from which the plurality corresponding to each model differs.
[0010]
[Embodiment of the Invention] The gestalt of desirable operation of this invention is explained referring to an accompanying drawing. Drawing 1 is a perspective view of the important section of a printer which has a holder holding the ink cartridge with a transponder concerning the gestalt of 1 operation of this invention, and this. With reference to drawing 1 R> 1, the ink cartridge 1 (only henceforth a cartridge 1) with this transponder is equipped with the cartridge body 3 which has the ink room 2 in which the ink of a liquid was stored. This cartridge body 3 has the lobe 4 which projects an abbreviation rectangular parallelepiped configuration in nothing and a back soffit. The print head 5 is formed corresponding to the underside of a lobe 4. Moreover, the transponder 7 is being embedded and fixed to the top face 6 of the cartridge body 3 where top-face 7a is exposed. In addition, even if it embeds a transponder 7 thoroughly, it is satisfactory on a function.
[0011] The printer 8 using the above-mentioned cartridge 1 has the holder 10 which divides the cartridge hold section 9, and the closing motion lid 11 for pressing down and holding the top face of the cartridge 1 held in the cartridge hold section 9 is formed in the surroundings of axis of rotation 12 free [rotation closing motion] at the upper bed of a holder 10. Moreover, the cartridge pilot switch 13 which detects that the cartridge 1 is set to a holder 10 in contact with the predetermined section of a cartridge 1 is formed in the cartridge hold section 9. Moreover, the scanner 15 (equivalent to a signal output means) containing the antenna 14 for oscillating an electromagnetic wave towards a transponder 7 and receiving an echo wave is attached in the rear face of the closing motion lid 11. The cartridge pilot switch 13 and the scanner 15 are connected to the control section 16 which controls operation of a printer 8.
[0012] In addition, in drawing 1 , 17 is an advice bar for the left right translation of a holder 10 being stabilized. The graphic display of the belt device for driving a holder 10 right and left etc. is omitted. With reference to drawing 2 , where the above-mentioned closing motion lid 11 is closed, it is made in contact [approach or] with the scanner 15 of the rear face of the closing motion lid 11 in the transponder 7 of the top face 6 of a cartridge 1 at the opposite condition. Moreover, where the closing motion lid 11 is closed, a cartridge 1 presses the cartridge pilot switch 13, and has switched on.
[0013] With reference to drawing 3 (a) which is a sectional view, as the capacitor 21 is formed in both sides of the insulating film 18 which consists of macromolecule resin as a dielectric between the aluminium foil 19 of a couple pasted up, respectively, and 20 and the aluminium foil 19 and 20 of at least 1 is shown in drawing 3 (b) which is a top view, a transponder 7 is carried out without a mold and forms the coil 22 in a curled form. Using the edge by the side of one of aluminium foil 19 and 20 (drawing right edge) as an electrode, respectively, the other end (drawing left end section) has connected aluminium foil 19 and 20 comrades through the conductor in a through hole.
[0014] According to such structure, as shown in drawing 4 , a transponder 7 is constituted by the closed circuit containing a capacitor 21 and a coil 22, and has the predetermined resonance frequency f. On the other hand, the scanner 15 has the oscillator 24 by which a load is carried out

in driver voltage with the actuation switch 23, and after it amplifies the signal from an oscillator 24 with amplifier 25, it sends the electromagnetic wave E1 of a frequency f from an antenna 14 through a circulator 26.
[0015] The carrier beam transponder 7 turns this to an antenna 14, the echo wave E2 is sent, and a signal is given to a comparator 29 through an antenna 14, amplifier 27, and the low pulsed filter 28. In a comparator 29, ID signal about the model of cartridge 1 will be outputted to a control section 16 by the comparison with a reference signal. The actuation switch 23 is connected to the control section 16, and a control section 16 outputs the signal which turns ON the actuation switch 23 in response to the detecting signal from the cartridge pilot switch 13.
[0016] Subsequently, with reference to the flow chart shown in drawing 5 , the actuation which distinguishes the propriety of a cartridge 1 to a printer 8 is explained. If what the cartridge 1 was set to the holder 10 for by the condition of normal is detected (step S1), by turning on the actuation switch 23, an oscillator 24 will operate and the electromagnetic wave E1 of the resonance frequency f of a cartridge 1 will be sent from an antenna 14 (step S2). In this, when the transponder 7 of the carrier beam cartridge 1 sends the echo wave E2, a cartridge 1 is judged to be adaptation and operation of a printer 8 is permitted (step S3, S4, S5).
[0017] On the other hand, when an echo wave is not received, it is judged that a cartridge 1 is unsuitable and operation of a printer 8 is forbidden (steps S3, S6, and S7). In addition, while forbidding operation of a printer 8, you may make it make the lamp (for example, LED) which displays this turn on. With the gestalt of this operation, the model of cartridge 1 can be recognized according to non-contact using the transponder 7 attached in the cartridge 1. Since it is the easy structure where a transponder 7 contains a coil 22 and a capacitor 21, actuation is trustworthy while a manufacturing cost is cheap.
[0018] the case where paste up aluminium foil 19 and 20 on both sides of the insulating film 18, and a transponder 7 is constituted especially -- very thin structure -- cost -- since the cheap transponder 7 is realizable, an ink cartridge is not enlarged And since it can distinguish whether it is the ink cartridge 1 which suits a printer 8 by the printer 8 side, it can prevent certainly that it is used by special ink, for example to the printer for standard ink, mistaking. Thereby, it can collateralize attaining communalization of the components of most cartridges 1 substantially.
[0019] In addition, it is also possible for this invention not to be limited to the gestalt of the above-mentioned implementation, it to distinguish the model of cartridge, as it oscillates the frequency from which plurality differs with the oscillator 24 of a scanner 15 one by one, and to choose the control approach of the print head according to a model. In addition, modification various in the range of this invention, such as using a coil coil, a pad coil, an etching coil, a Flint wiring coil, a printing coil, etc., can be performed as a coil.
[0020]
[Effect of the Invention] In invention according to claim 1, it becomes possible to recognize the model of cartridge by non-contact using the transponder attached in the cartridge. Since it is the easy structure where a transponder contains a coil and a capacitor, actuation is trustworthy while a manufacturing cost is cheap. the very thin structure which pasted up aluminium foil on both sides of an insulating film in invention according to claim 2 -- cost -- since a cheap transponder is realizable, an ink cartridge is not enlarged
[0021] In invention according to claim 3, the misuse of a cartridge can be certainly prevented by distinguishing by the printer side whether it is the ink cartridge which suits a printer. Thereby, it can collateralize attaining communalization of the components of most cartridges substantially.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the printer using the ink cartridge with a transponder and this which oscillate an echo wave according to the electromagnetic wave of a predetermined frequency.

EFFECT OF THE INVENTION

[Effect of the Invention] In invention according to claim 1, it becomes possible to recognize the model of cartridge by non-contact using the transponder attached in the cartridge. Since it is the easy structure where a transponder contains a coil and a capacitor, actuation is trustworthy while a manufacturing cost is cheap. the very thin structure which pasted up aluminium foil on both sides of an insulating film in invention according to claim 2 -- cost -- since a cheap transponder is realizable, an ink cartridge is not enlarged

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TECHNICAL PROBLEM

[Description of the Prior Art] In recent years, what sets the ink cartridge which the ink jet printer had spread quickly and held ink to the holder by which both-way actuation is carried out, and uses it for right and left of a printer is common. As ink stored in the ink room of a cartridge, there is ink used for the particular application of other, for example, MICR, ink [ink / for general OA / ink jet], fluorescence ink, edible ink, etc. On the other hand, although a water or oily thing is used as ink, since the physical-properties values (surface tension, a consistency, viscosity, etc.) of an ink ingredient have big effect on generating of an ink droplet and influence the blinding of a nozzle, various ingredient selections are performed. That is, what suited the injection method of the print head and the method which controls the print head is chosen.

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[0004] While this invention is made in view of the above-mentioned technical problem and being able to attain a cost cut through communalization of components, it aims at offering the ink cartridge with a transponder which does not have a possibility of causing nonconformity in a print facility, and the printer using this.

MEANS

[Means for Solving the Problem] As a technical-problem solution means for attaining the above-mentioned object, the mode of invention according to claim 1 It is attached in the cartridge body which has the ink room in which ink is stored, and this cartridge body. It has a transponder with the predetermined resonance frequency corresponding to the model of cartridge. The ink cartridge with a transponder characterized by for this transponder being constituted by the closed circuit containing a coil and a capacitor, resonating on the electromagnetic wave which has the frequency which is in agreement with the above-mentioned predetermined resonance frequency, and oscillating an echo wave is offered.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the typical perspective view showing the ink cartridge with a transponder of the gestalt of 1 operation of this invention, and the important section of a printer.
[Drawing 2] the condition that the ink cartridge was set to the holder of a printer is shown -- it is a fracture side elevation a part.
[Drawing 3] (a) And (b) is the sectional view and top view of a transponder, respectively.
[Drawing 4] It is the mimetic diagram showing the electric configuration of a transponder and a printer.
[Drawing 5] It is the flow chart which shows actuation of model distinction of a cartridge.
[Description of Notations]
1 Cartridge
3 Cartridge Body
7 Transponder
8 Printer
9 Cartridge Hold Section
10 Holder
11 Closing Motion Lid
12 Axis of Rotation
13 Cartridge Pilot Switch
14 Antenna
15 Scanner (Signal Output Means)
16 Control Section
18 Insulating Film
19 20 Aluminium foil
21 Capacitor
22 Coil
23 Actuation Switch
24 Oscillator

[Translation done.]